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CITATION:

小笠原, 義仁 ...[et al]. On a Primitive Chaos (Set-theoretic/geometric topology and related topics). 数理解析研究所講究録 2015, 1932: 67-70: KJ00009632399.

ISSUE DATE:

2015-01

URL:

<http://hdl.handle.net/2433/223627>

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## On a Primitive Chaos

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We are trying to recognize the mathematical method, topology, not only as discussions on concepts of morphology, but also as discussions on morphology of concepts or as discussions on morphology of our interior views [1-8]. Namely, we are trying to use it as a method for overcoming the dualism of mind and matter and the dualism of objectivity and subjectivity, or exploring the realm in which they are undualized.

Concretely, the following concept, primitive chaos, is discussed, which is a concept closely related to the fundamental problems of sciences themselves such as determinism, causality, free will, predictability, time asymmetry, and irreversibility [9, 10].

**Definition.** *If a set  $X$ , the family of subsets of  $X$ ,  $\{X_\lambda; \emptyset \neq X_\lambda \subset X, \lambda \in \Lambda\}$ , and the family of maps,  $\{f_{X_\lambda} : X_\lambda \rightarrow X, \lambda \in \Lambda\}$ , satisfy the following property (P),  $(X, \{X_\lambda, \lambda \in \Lambda\}, \{f_{X_\lambda}, \lambda \in \Lambda\})$  is called primitive chaos.*

(P) *For any infinite sequence  $\omega_0, \omega_1, \omega_2, \dots$ , there exists an initial point  $x_0 \in \omega_0$  such that  $f_{\omega_0}(x_0) \in \omega_1, f_{\omega_1}(f_{\omega_0}(x_0)) \in \omega_2, \dots$ , where  $\omega_i \in \{X_\lambda, \lambda \in \Lambda\}$  for each  $i$ .*

In the primitive chaos, each set  $X_\lambda$  implies an event or a selection, and each map  $f_{X_\lambda}$  implies a law or causality. Then, under natural conditions, the primitive chaos leads to the characteristic properties of the conventional chaos [11, 12]. In this sense, this primitive chaos is literally a primitive chaos.

Then, by exploring sufficient conditions for the guarantee of existence of the primitive chaos from a topological viewpoint, we can see the emergence of two contrast concepts, nondegenerate Peano continuum and Cantor set, along with the concepts of hierarchy, coarse graining, self-similarity, and logic [9, 10, 13]. From the fact that nondegenerate Peano continuum is characterized by its continuum and the Cantor set is characterized by its zero-dimensionality, these results seem to imply our intrinsic way of recognizing phenomena [10].

Then, based on these results, an actual phenomenon is discussed, which is a complicated electromagnetic phenomenon concerning carbon nanotubes and Coumarin6 molecules.

### Acknowledgements

The authors would like to acknowledge the support and useful comments of Professors Shin'ichi Oishi and Akira Koyama of Waseda University, and the helpful discussions of Professors Emeritus Yoshisuke Ueda of Kyoto University and Tsuneo Watanabe of Toho University. This study was supported by the Japan Science and Technology Agency.

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